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FILING DATE.

APPLICATION NUMBER: 60/386,988

FILING DATE: June 07, 2002

RELATED PCT APPLICATION NUMBER: PCT/US03/17446

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30 U.S. PTO
06/07/02

Practitioner's Docket No. 65961-0039

PATENT

Preliminary Classification

Proposed Class:
Subclass:

U.S. PTO
607386988
06/07/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Kidd, Lisa Ann; Jones, Dana Marie ; Beckley, Daniel Vern; Wenglinski, Daniel Edward; Fritsch, Manfred; Bailey, Tom; and Gaudreau, Larry

For: MULTI-SHOT INJECTION MOLDED COMPONENT AND METHOD OF MANUFACTURE

Box Provisional Patent Application
Commissioner for Patents
Washington, D.C. 20231

COVER SHEET FOR FILING PROVISIONAL APPLICATION
(37 C.F.R. SECTION 1.51(c)(1))

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 C.F.R. section 1.51(c)(1)(i). The following comprises the information required by 37 C.F.R. Section 1.51(c)(1):

CERTIFICATION UNDER 37 C.F.R. SECTION 1.10*

(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on June 7, 2002, in an envelope as "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service under 37 C.F.R. Section 1.10, Mailing Label Number EV 064 962 810 US addressed to the Commissioner for Patents, Washington, D.C. 20231.

Christy Taylor

(type or print name of person mailing paper)

Christy Taylor
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(Cover Sheet for Filing Provisional Application--page 1 of 4)

1. The names of the inventors are (37 C.F.R. Section 1.51(c)(1)(ii)):

1. Lisa Ann Kidd
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3. Daniel Vern Beckley
4. Daniel Edward Wenglinski
5. Manfred Fritsch
6. Tom Bailey
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3. The title of the invention is (37 C.F.R. Section 1.51(c)(1)(iv)):

MULTI-SHOT INJECTION MOLDED COMPONENT AND METHOD OF MANUFACTURE

4. The name, registration, customer and telephone numbers of the practitioner are (37 C.F.R. Section 1.51(c)(1)(v)):

Name of practitioner: Peter J. Rashid, Reg. No. 39,464
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5. The docket number used to identify this application is (37 C.F.R. Section 1.51(c)(1)(vi)):

Docket No. 65961-0039

6. The correspondence address for this application is (37 C.F.R. Section 1.51(c)(1)(vii)):

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7. Statement as to whether invention was made by an agency of the U.S. Government or under contract with an agency of the U.S. Government. (37 C.F.R. Section 1.51(c)(1)(viii)).

This invention was NOT made by an agency of the United States Government, or under contract with an agency of the United States Government.

8. Identification of documents accompanying this cover sheet:

A. Documents required by 37 C.F.R. Section 1.51(c)(2)-(3):

| | | |
|----------------|---------------|---|
| Specification: | No. of pages | 6 |
| Drawings: | No. of sheets | 7 |

B. Additional documents:

| | | |
|----------|---------------|---|
| Claims: | No. of claims | 5 |
| Abstract | | |

9. Fee

The filing fee for this provisional application, as set in 37 C.F.R. Section 1.16(k), is \$160.00 for other than a small entity.

10. Fee payment

Fee payment in the amount of \$160.00 is being made at this time.

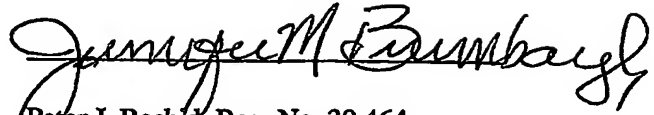
11. Method of fee payment

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10-7-02



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202090-8869809

APPLICATION DATA SHEET (ATTORNEY DOCKET NO. 65961-0039)

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APPLICATION INFORMATION

Title Line One: Multi-Shot Injection Molded Component and Method of
Manufacture
Total Drawing Sheets: 7
Application Type: Provisional
Docket Number: 65961-0039

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MULTI-SHOT INJECTION MOLDED COMPONENT
AND METHOD OF MANUFACTURE

Technical Field

[0001] The present invention relates to an automotive component, and in particular to a door panel having integrated soft-touch switches and arm cushions.

Background of the Invention

[0002] Traditional interior door panels serve many functions in the operation of an automobile. First and foremost the door panel provides an L-shaped support for an arm of a passenger traveling in the vehicle. The horizontal portion being an armrest and the vertical portion being a bolster. These portions may be formed from a variety of different materials including vinyl, cloth, plastic or leather. Certain materials, such as leather, provide a softer feel and are more comfortable to the passenger. However, these materials are more expensive. Rougher materials such as hard plastic are less expensive and easier to manipulate into the armrest and bolster of the door panels. The door panels made of plastic can easily be formed by traditional injection molding techniques. There remains a need in the automotive industry to create door panels in which the armrests and bolsters are easy and inexpensive to manufacture yet provide a soft and comfortable feel to the vehicle passenger.

[0003] An additional function of the interior door panel is to provide switches for electronically controlling features such as power door locks, power windows, and power mirrors. Traditional door panels provide an aperture for receiving a switching mechanism having a plurality of switches for controlling the power features. This technique produces a variety of quality control problems. First, the non-integral switches produce fit and finish problems, including difficulties controlling buzzes, squeaks and rattles generated by the switching mechanism. Additionally, because the switches are not integral and reside in the aperture of the door panel, a gap remains once the switching mechanism is installed. This gap allows contaminants to invade the switching mechanism thereby producing failures of the power features of the vehicle after prolonged exposure to the contaminants. There remains a need to produce door panels that include switches and switching mechanism in which quality

control concerns are reduced and the door panels are easily and inexpensively produced.

[0004] Finally, the interior door panels of a vehicle also provide an aesthetic benefit to the vehicle. The door is one of the first features a passenger observes when entering a vehicle. Furthermore, people spend increasing amounts of time in their vehicles each day and expect the interiors of their vehicles to be functional, comfortable and pleasing to their eyes. Similarly, designers of automotive interiors are continually striving to produce fresh, unique design to please their customers. Traditional door panels are generally one solid monotone color. Perhaps with a cloth covering the panels will receive a pattern or contrasting color. There remains a need in the automotive industry to produce door panels using an inexpensive, easily manufactured alternative that provides flexibility in the design and color schemes of vehicle interiors.

Summary of the Invention

[0005] The inventors of the present invention have recognized these needs and other problems associated with traditional interior components and accessories. To this end, the inventors have developed an interior component and method of manufacture that is inexpensive, convenient, provides for the use of different materials, reduces quality problems and permits alternative color schemes.

[0006] Specifically, the invention is a component comprising a core portion made from a first material. A second portion, made of a second material, is integrally formed with the core portion. The first and second materials may be the same material or may be different materials, depending on the application. The method for manufacturing includes forming the core portion from the first material in a mold cavity defined by a first volume. Once the first material has cured, then the mold cavity is altered to form a second volume. The second material is injected into the mold cavity having the second cavity and becomes integrally formed with the first, core portion. Once the second material has cured, the component is removed from the mold cavity.

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Brief Description of the Drawings

[0007] The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

[0008] Figure 1 is a perspective view of a switch assembly according to one embodiment of the present invention;

[0009] Figure 2 is a cross-sectional view of a switch assembly in accordance with the invention;

[0010] Figure 3 is a perspective view of a switch assembly according to a second embodiment of the present invention;

[0011] Figure 4 is a cross-sectional view of the switch assembly of Figure 3;

[0012] Figure 5 is a perspective view of a door panel assembly in accordance with the invention;

[0013] Figure 6 is a perspective view of the door panel of Figure 5; and

[0014] Figure 7 is an additional perspective view of the door panel of Figure 5.

Description of the Preferred Embodiment

[0015] The subject invention is a method of manufacturing a component, generally illustrated throughout the figures at 10, using a multi-shot injection molding technique. The multi-shot molding technique requires a mold cavity (not shown) that can be altered between a first volume and a second volume. Although the subject invention involves the use of a mold cavity that can be altered from a first volume to a second volume, the invention is not limited by the number of volumes in which the mold cavity can be altered, and that the invention can be practiced with a mold cavity that be altered into any desirable number of volumes to form the component. Initially, the mold cavity is positioned having the first volume for receiving a first material. Then, the first material is injected from a well-known nozzle (not shown) into the first volume of the mold cavity. Once the first material is permitted to cure and form a core portion 14, the mold cavity is altered to the second volume for receiving the second material.

[0016] There are a variety of techniques that permit altering the mold cavity from the first volume to the second volume. Such techniques include the use of a moveable slide, transfer molding, core pull-back or even the use of a rotating platen. Any technique is appropriate and the scope of the invention is not limited to a technique for altering the mold cavity from the first volume to the second volume.

[0017] Once the mold cavity has been altered from the first volume to the second volume, a second material is injected into the mold cavity from the nozzle. The second material covers at least a portion of first material, and upon curing becomes integrally formed with the covered portion of the first material. After the second material has sufficiently cured, component 10 is removed from the mold cavity. Then, the mold cavity is altered from the second volume to the first volume, and the process is repeated for subsequent components 10.

[0018] It is preferred that the multi-shot molding technique utilizes only one nozzle for injecting first material and second material. Although only one nozzle is preferred, the method of the invention may be properly performed using more than one nozzle, such as two nozzles, one nozzle for the injecting the first material and a second nozzle for injecting the second material.

[0019] One aspect of the multi-shot injection molding technique of the invention is that the first material and second material can be different materials or substances having different material properties, such as hardness, color, conductivity, or the like. For example, the first material can be a plastic material that forms a rigid material, such as the rigid core portion 14 when cured, and the second material can be a plastic material that forms a soft material when cured. Once the first material is cured, a rigid core portion 14 is formed that acts as a substrate for receiving the second material. Then, the second material is injected over core portion 14 to form a second portion 18 that has a softer feel when touched by a user.

[0020] It will be appreciated that other material properties, such as the type of material or material hardness, can be different using the multi-shot injection molding technique of the invention. For example, first material and second material may also be of different colors, as well as being different hardness. The opportunity to use different colored materials permits a wider choice in color schemes and design of the

component. It should be appreciated that other differences in material properties between the first and second materials are contemplated by the invention.

[0021] One illustrative embodiment of the multi-shot injection molding technique is with an accessory, such as a bezel and switch component 10, as best seen in Figures 1 and 2. For operator convenience, switches for controlling power locks, power mirrors and power windows are traditionally positioned on an armrest 28 of a door panel. To alleviate various quality concerns with conventional switch components, the bezel and switch component 10 may be integral with the armrest 28. To integrate component 10 with the armrest 28, the multi-shot injection molding technique is utilized. Rigid core portion 14 is formed from first material and acts as a substrate for second portion 18. Second portion 18 includes a plurality of switches 19 for controlling power features of the vehicle. The switches 19 may include identifying markings 21 to ease operator identification. The switches 19, as part of second portion 18, are formed from the second material that forms the soft-touch plastic material when cured. Accordingly the switches 19 are easy to operate and are soft when touched by the user so as to provide a tactile feedback mechanism to the user.

[0022] To properly operate the switches 19, a circuit assembly 22 is fastened to core portion 14. A plurality of fasteners 26 may be used to attach assembly 22 to core portion 14 and also contact the switches 19. Actuation of each switch 19 actuates a different portion of circuit assembly 22 that, in turn, controls a respective power feature of the accessory.

[0023] A modified embodiment of bezel and switch component 10 is shown in Figures 3 and 4. Second portion 18 still includes a plurality of switches 19, but the markings 21 are not separately included as in the embodiment of Figures 1 and 2. Instead, a cover 20 with integrally formed identifying markings 23 is applied over core portion 14 and second portion 18. The cover 20 may be made from spray urethane or is rotocast. The cover 20 helps to prevent the switches and circuit assembly 22 from becoming contaminated with particles of dirt and dust. One side of the cover 20 may also include foam layer 24 to provide dimension and shape to bezel and switch component 10.

[0024] Another illustrative embodiment of the multi-shot injection molded component comprises an interior vehicular door panel, shown generally at 10 in Figures 5-7. The door panel 10 is comprised of an armrest 28 and a bolster 30. Both armrest 28 and bolster 30 are in frequent contact with an arm of a passenger traveling in the vehicle. Accordingly, the passenger would prefer that the contact surfaces are comfortable and soft. Use of the multi-shot molding techniques achieves this objective. The core portion 14 of first material can be relatively rigid material, while second portion 18 of second material can be made from the relatively soft material, such as a soft-touch plastic material. The second portion 18 forms a plurality of arm cushions 32. The shape and quantity of the cushions 32 are not limited to the illustrations and may also be included in on the armrest 28. Cushions 32 provide a soft, comfortable feel to the arm of the passenger. Additionally, the second material may be of a different color; therefore, cushions 32 would also provide a contrast in the interior trim design.

[0025] It should be understood that embodiment described above is illustrative of a preferred embodiment of the subject invention. The subject invention is applicable to various other alternative embodiments. The scope of the invention is not limited to door panels, interior trim or automotive applications. It is intended that the following claims define the scope of the invention and that the method and apparatus within the scope of these claims and their equivalents be covered thereby.

Claims

What is claimed is:

1. A component comprising:
 - a core portion formed of a first material;
 - a second portion formed of a second material and integrally connected to said core portion; and
 - wherein said first material and said second material are plastics and said second material is a soft touch plastic.
2. The component according to Claim 1, further including a cover applied over said core portion and said second portion.
3. The component according to Claim 1, further including a circuit assembly attached to said core portion.
4. A method for forming a component, comprising the steps of:
 - providing a mold cavity having a first volume;
 - injecting a first material into the first volume of the mold cavity to form a core portion of a component;
 - curing the first material in the mold cavity;
 - altering the mold cavity to form a second volume;
 - injecting a second material into the mold cavity defined by the second volume to form a second portion of the component;
 - covering a portion of the first material with the second material;
 - curing the second material in the mold cavity; and
 - removing the component from the mold cavity.
5. The method according to Claim 4 further comprising the step of applying a cover over the second material.

MULTI-SHOT INJECTION MOLDED COMPONENT
AND METHOD OF MANUFACTURE

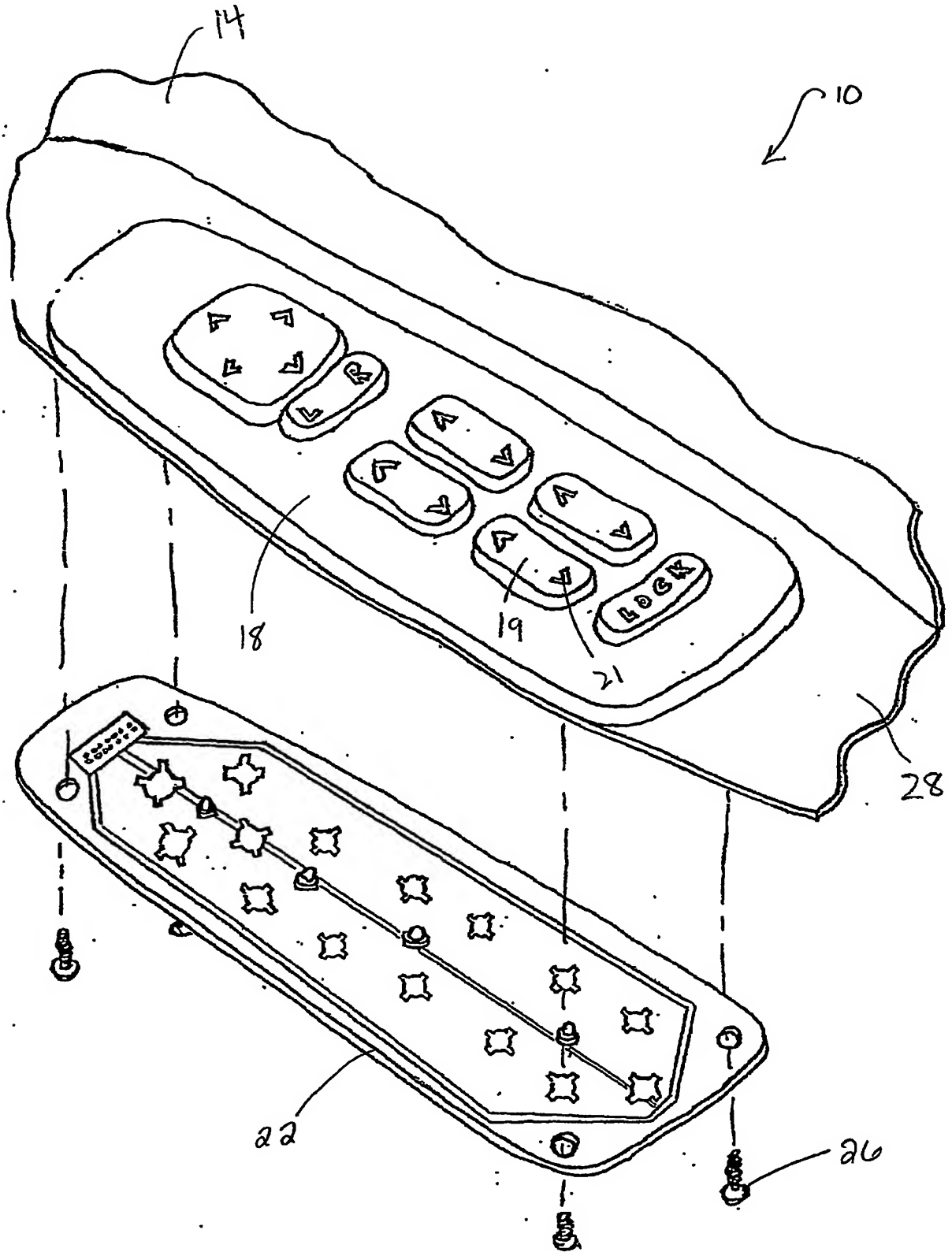
Abstract of the Disclosure

An automotive component, specifically an interior trim door panel, and method for forming the same is disclosed. The door panel is defined by a core portion formed of a first material and a second portion integral with the core portion and formed of a second material. Both the first and second materials are plastic although the second material is a soft-touch plastic. The method for forming the component comprises the steps of injecting the first material into a first cavity of a mold, curing the first material to form the core portion, altering the mold cavity to form a second cavity and injecting the second material into the second cavity to form the second portion of the component.

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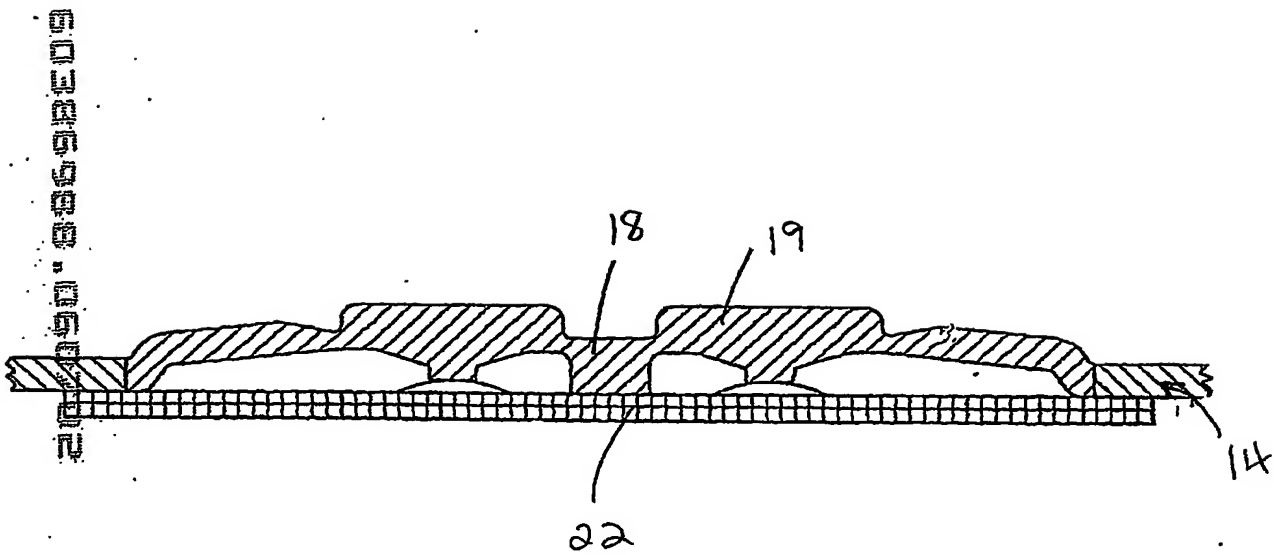
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FIG. 1



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FIG. 2

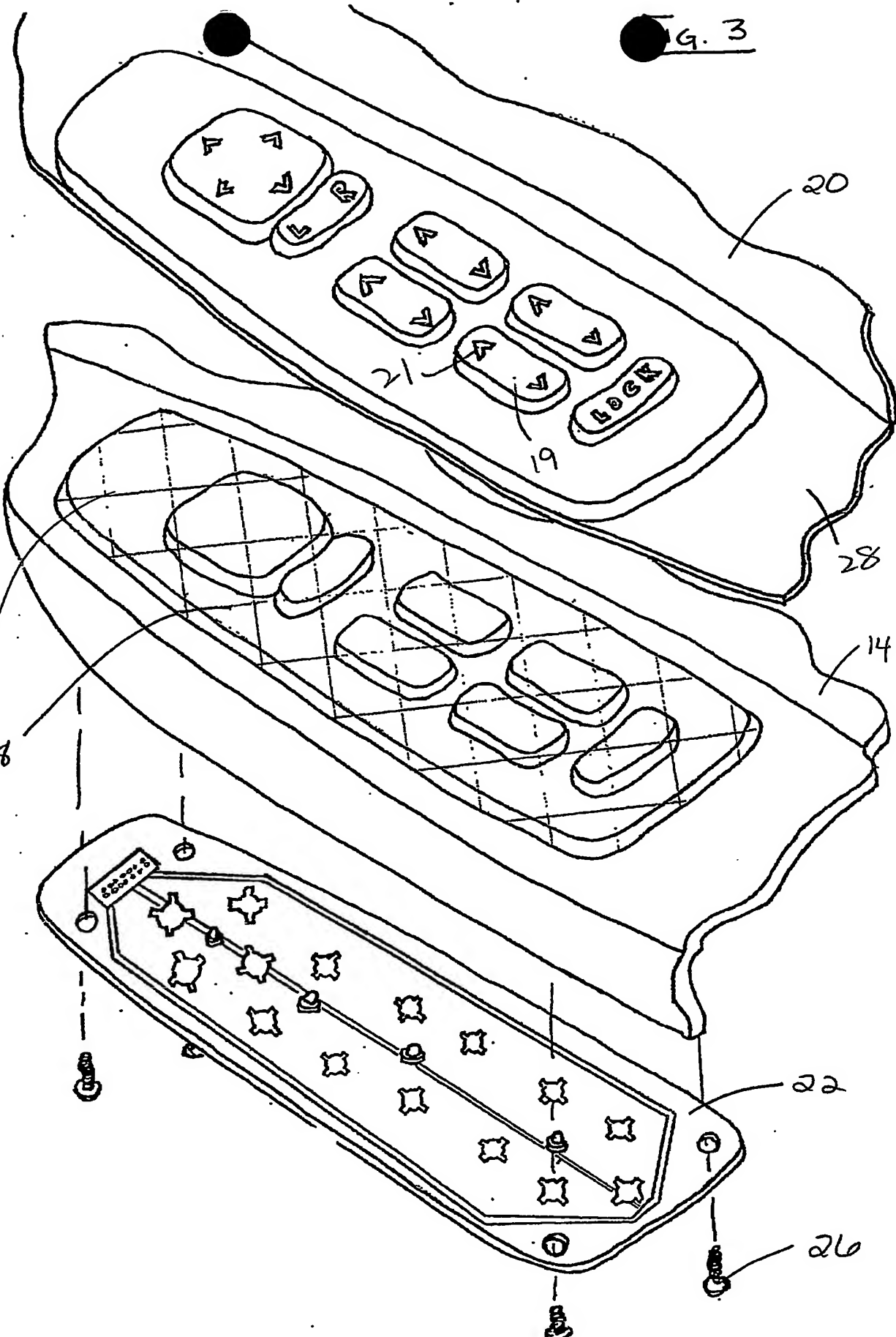


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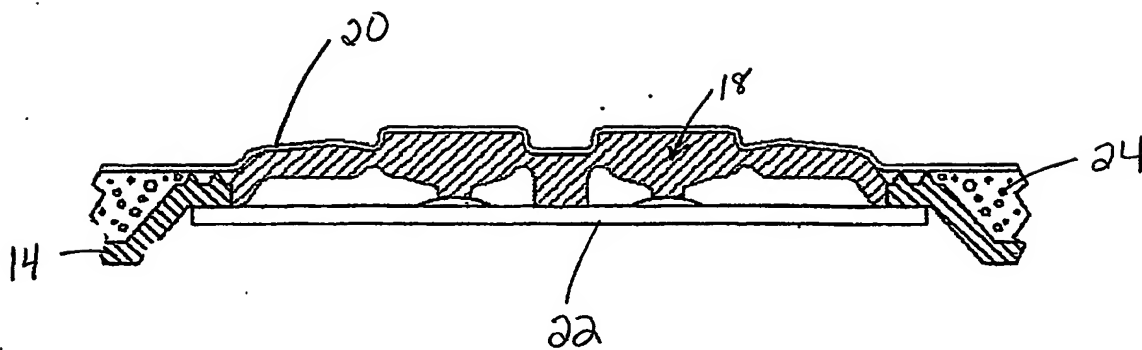
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14

22

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FIG. 4



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FIG. 5

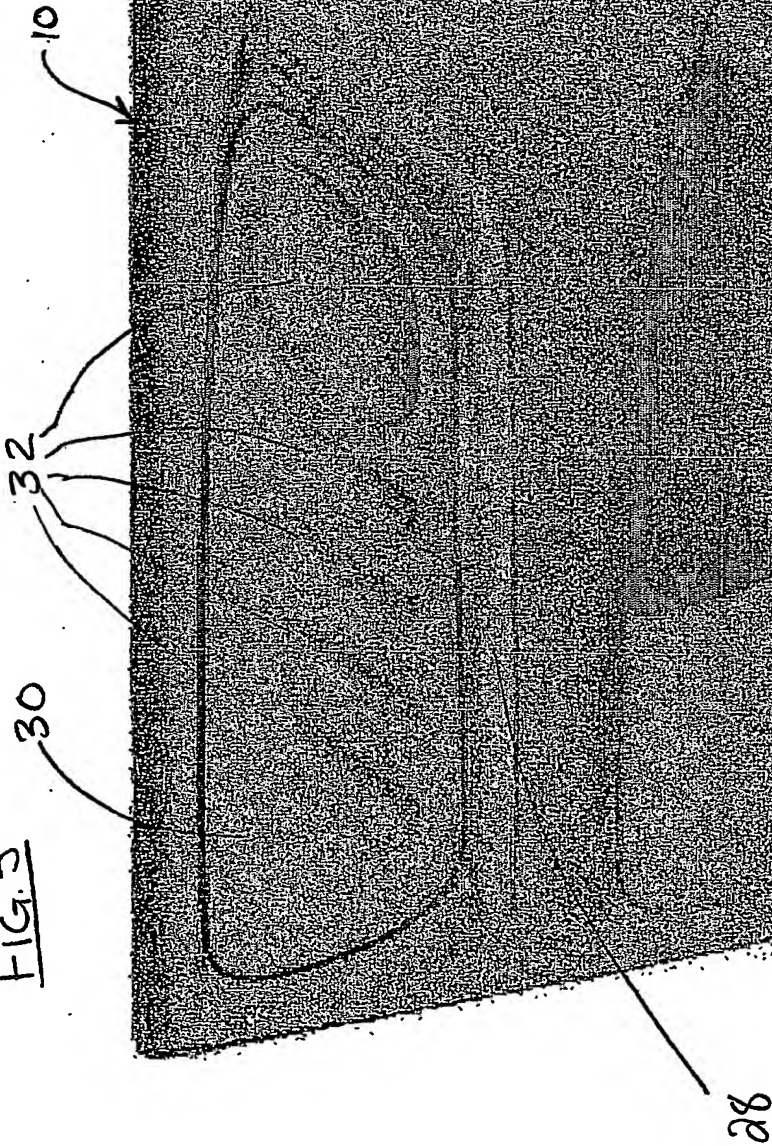
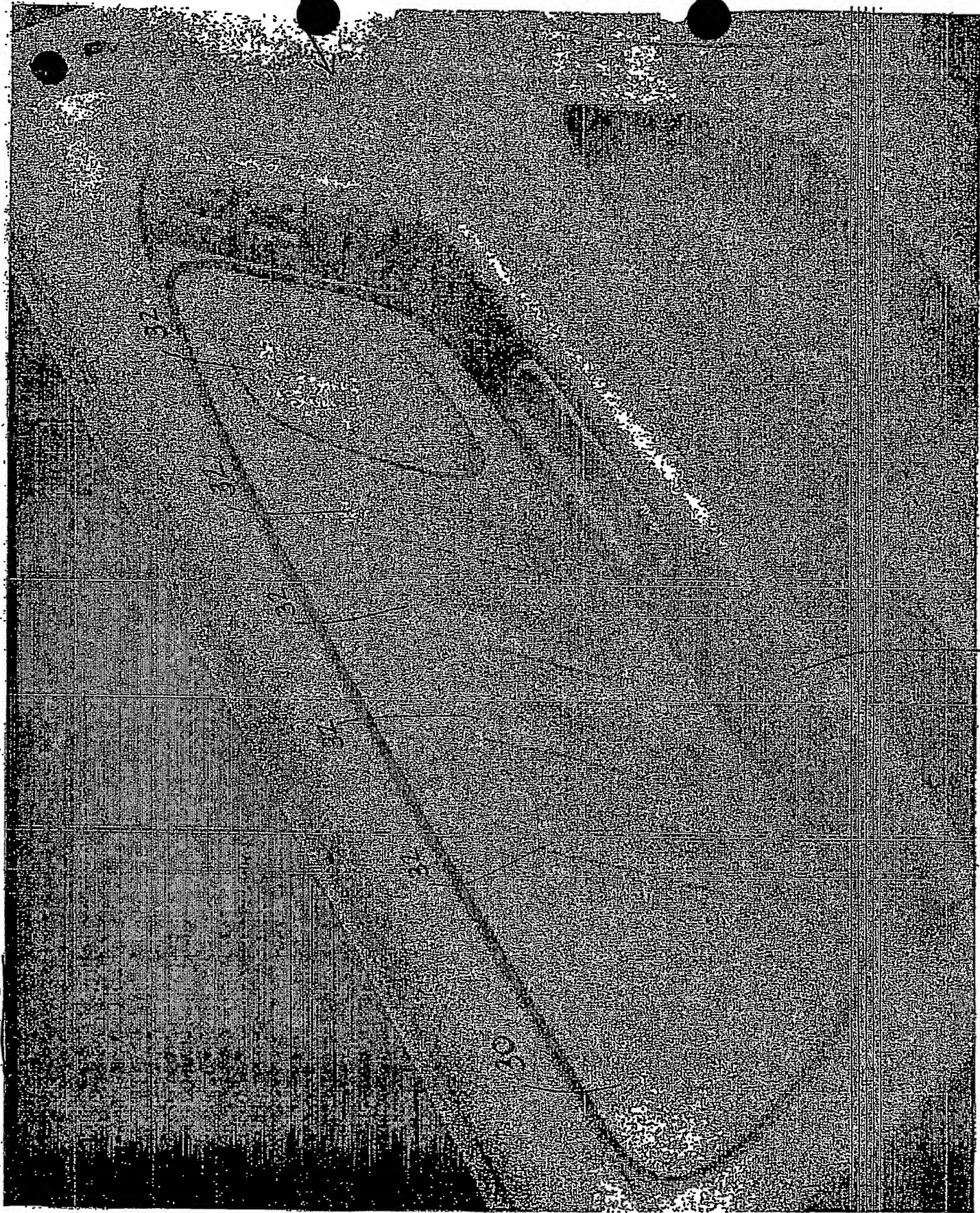


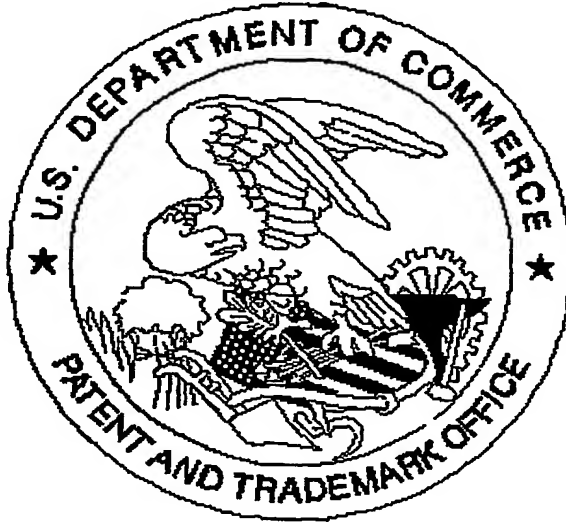
Fig. 6



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